Putting Research to Work

RD&T E-Newsletter, May 2004

Technical information for state DOT highway professionals

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WisDOT RD&T Home

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Research World

International Transportation Programs, Publications and Meetings

FHWA's Office of International Programs aims to "inform the domestic highway community of technological innovations in foreign countries that could significantly improve highway transport in the United States…" Of particular interest on the FHWA Web site:

- Full-text reports of new transportation technologies abroad related to bridges, pavements, planning and environment, operations, policy and safety http://international.fhwa.dot.gov/links/pubs.cfm
- Links to transportation agency and association Web sites by continent and country, including global resources such as the United Nations and World Bank http://international.fhwa.dot.gov/links/intl.cfm

Preventing Traffic Accidents, Worldwide

Over 50 million people are injured or killed every year in crashes on the world's roads, according to a report issued by the World Health Organization and the World Bank. "World Report on Road Traffic Injury Prevention" details the problem and recommends actions that highway agencies and others can take to make roads safer. Download the report at http://www.who.int/world-health-day/2004/infomaterials/world_report/en/. Courtesy of the TRB E-Newsletter.

Brits Lay Concrete on Sandstone

The London-based international transportation research firm Transport Research Laboratories describes uses of sandstone on highways in the United Kingdom. Pulverized, the material is being tested as bedding for portland cement concrete. Though current tests involve parking lots, other uses may develop. See the April 2004 TRL News at http://www.trl.co.uk/1024/mainpage.asp?page=1013.

Fly-By-Wire Technology Hits the Ground

Fly-by-wire control systems are well established in the aerospace industry. Now participants in one Information Society Technologies project, Powertrain Equipped with Intelligent Technologies, plan to introduce the same capabilities to road vehicles, potentially cutting road accidents in the European Union in half. From Innovations Report: http://www.innovations-report.com/html/reports/logistics/report-27965.html.

Intelligent Road Studs Light the Way for Safety

A highway in Scotland is the newest testing ground for intelligent road studs, lights that can sense fog, rain and ice and flash to guide drivers through difficult weather conditions. The lights also detect slow traffic, warning drivers of potential incidents ahead. See the BBC News article at http://news.bbc.co.uk/1/hi/scotland/3645359.stm, and find out more about the technology at http://www.astucia.co.uk/. Courtesy of Transportation Communications Newsletter.

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Other e-newsletters for transportation professionals:
TRB E-Newsletter from the Transportation Research Board: http://gulliver.trb.org/news/.
Transportation Communications Newsletter: http://groups.yahoo.com/group/transport-communications/.
CTS Research E-News from the University of Minnesota: http://www.cts.umn.edu/publications/enews/.

Designing for the Future

Roundabout to Reshape Mount Horeb Intersection

A new roundabout will improve the safety of the Mount Horeb intersection of WIS 78 and WIS 92, which is currently challenged by sharp turning angles and a curve through the intersection from east to west. The District 1 project, which is now under construction, also includes islands that will allow pedestrians to cross the road more safely. For more information, including a sketch of the roundabout, see http://www.dot.wisconsin.gov/projects/d1/mthoreb/design.htm.

Innovations Mark Milwaukee Viaduct Design

District 2's Sixth Street Viaduct project in Milwaukee holds a lot of records: The four-lane bridge is Wisconsin's first cable-stayed structure for vehicular traffic, and the widest flat-slab cable-stayed bridge constructed in the United States. The award-winning system, which also features the state's first double-lane roundabout, is detailed in the current issue of HNTB's *Designer* magazine. Read more on page 15 at http://newsroom.hntb.com/downloads/designer77.pdf.

Barge Rams Bridge Pier—Deliberately

With an aging bridge slated for demolition, Florida DOT and University of Florida engineers took the opportunity last month to set up a $1 million crash-impact experiment—they rammed the bridge repeatedly with a 1,000-ton barge. Since most bridge design standards are based on scale-model crash tests, the data from this experiment could affect national design codes. See http://www.reuters.com/newsArticle.jhtml?type=topNews&storyID=4753636. Courtesy of ITD Transporter.

New Hampshire, Other DOTs Showcase "Exemplary Ecosystems"

In designing a wetlands mitigation strategy for its improvements to Route 101, New Hampshire DOT took a broad "landscape approach" that included replacing culverts with a twin-span bridge, creating and improving freshwater wetlands, and recycling sand and gravel from the wetlands site for use on the road. The project is one of eight profiled at FHWA's new Exemplary Ecosystem Initiatives Web site. See http://www.fhwa.dot.gov/environment/ecosystems/index.htm.

Tennessee DOT Issues New Public Involvement Guidelines

Tennessee DOT has posted its newly revised Public Involvement Plan on its Web site. The guidelines include a system for deciding the level of public input needed on a project, a list of public involvement activities that go beyond the minimum requirements, and performance measures to evaluate the success of an outreach effort. View the plan at http://www.tdot.state.tn.us/documents/PIP_040804andTOC.pdf.

Mobile GIS, Bicycle Squads Fit the Bill for City Surveying Job

To comply with Americans with Disabilities Act requirements, the city of Oakland needed to make sure its curb ramps were accessible to all users. This meant a comprehensive survey of every intersection in the city, which encompasses over 50 square miles. To get the job done quickly, field workers took to the streets on bicycles, with handheld computers outfitted with mobile GIS software mounted to their handlebars. Read more in the latest edition of ESRI's *ArcUser* magazine at http://www.esri.com/news/arcuser/0104/curbramp.html.

New Guidelines for Passing Lanes

Incorporating passing lanes on a two-lane highway reduces accidents and improves a road's level of service by up to two levels, according to a new Missouri DOT study. The study includes recommendations for passing lane design and criteria for site selection, and includes case studies of five passing lane configurations on Missouri's highways. Read the report at http://www.modot.state.mo.us/services/rdt/reports/RI02018/RDT04008.pdf.

Construction and Materials Innovations

Splicing Girders to Extend Concrete Bridges Affirmed

NCHRP Report 517, just posted online, concludes from a study of dozens of extended concrete bridge spans around the country that spliced segments of prestressed concrete girders work effectively. While current AASHTO load and resistance factor design specifications are adequate for spliced-girder bridges, researchers recommend that revised guidelines specific to these bridges be developed. http://gulliver.trb.org/publications/nchrp/nchrp_rpt_517.pdf

Texas Reports on Accelerated Construction Techniques

FHWA has posted a report from an accelerated construction workshop hosted by Texas DOT last fall. TxDOT hopes to draw together the latest in all aspects of planning and construction to hasten a large Dallas project. http://www.fhwa.dot.gov/construction/accelerated/pegasus.htm

Mix the Perfect Concrete at Your Desk

In its latest *Research and Technology Transporter*, FHWA announces the posting of a report that helps engineers navigate the increasingly sophisticated options for mixing concrete to specific needs. The report describes how to optimize concrete mixture to meet strength objectives, chloride penetration resistance, flowability and more. It also points to a new software tool for creating such mixes. See http://www.tfhrc.gov/pavement/pubs/03060/index.htm.

Science Looks Deeper at Alkali-Silica Gels

The Turner-Fairbank Highway Research Center recently turned to an Australian chemist for insight on the alkali-silica gel that destroys concrete pavement. John Phair looks at nanoscale properties of the gel to determine what conditions cause it to swell. His research could lead to better roads. See the April *Research and Technology Transporter* at http://www.tfhrc.gov/trnsptr/apr04/index.htm#ar.

How About a Little Dirt with Your Cement?

The Portland Cement Association has highlighted on its Web site a section devoted to soil cements. These pages offer links as well as clear and approachable reports on improving subbases by modifying soil with cement, creating soil-cement bases, using full-depth reclamation, and treating bases with cement. http://www.cement.org/pavements/pv_sc.asp.

Test Freeze-Thaw in Days, Not Months

Minnesota DOT and University of Minnesota researchers recently helped develop a freeze-thaw test for concrete samples that takes seven days, rather than several months. The process involves high-pressure injection of water into room-temperature samples. See the article in CTS Research E-News at http://www.cts.umn.edu/news/renews/2004/04/index.html#freeze, and view the study at http://www.lrrb.gen.mn.us/pdf/200328.pdf.

Maine Pulls Off a Continuous Pour of 330 Loads

To replace a 1931 bridge, Maine workers poured a 60- by 70- by 16-foot foundation for New England's second cable-stay bridge. During a 30-hour work marathon, 26 trucks delivered 330 loads of concrete—11 million pounds—mixed by a single company from a single source. See the April 23 *AASHTO Journal* at http://www.transportation.org/publications/HTMLJournal.nsf and a newspaper report, http://www.pressherald.com/news/state/040416bridge.shtml.

Virginia Heat-Straightens Bridge Beam

When a truck collision bent a steel beam on a Virginia bridge, engineers tried a new method for repair, one cheaper than replacement. Rather than using hot mechanical bending, which can introduce flaws and which doesn't suit beams connected to decks by steel studs, engineers tried heat straightening. Carefully heating sections to 1,200 F allowed the contracting action of cooling steel to straighten the beam. See http://www.highwayengineers.org/scanner032504d.html.

Operating/Optimizing the System

WisDOT and FHWA Sponsor Conference on Visibility

A National Highway Visibility Conference will be held at the University of Wisconsin-Madison May 18 to 19, 2004, "to advance the state of the practice related to roadway visibility detection and mitigation measures, with an emphasis on fog." National experts will address safety, policy and technical issues. See the conference Web site at http://www.topslab.wisc.edu/nhvc/.

Streamlining Maintenance and Operations Can Benefit Environment

With a new emphasis on operations and maintenance planning, many DOTs have developed successful programs that include integrated roadside vegetation management, salt reduction, and water quality improvement. In the process environmental specialists have been added to the traditional mix of maintenance and construction staff. Read more in FHWA's *Successes in Streamlining* newsletter: http://environment.fhwa.dot.gov/strmlng/newsletters/apr04nl.htm.

Reflectivity Standards for Signs

How bright is bright enough? How long will a sign last? What special visibility needs do older drivers have? Researchers at the Texas Transportation Institute investigated these and other topics to establish reflectivity standards for FHWA's *Manual on Uniform Traffic Control Devices.* Read about their work in the *Texas Transportation Researcher:* http://tti.tamu.edu/researcher/newsletter.asp?vol=40&issue=1&article=4. See the full research results at http://www.tfhrc.gov/safety/pubs/03082/index.htm.

New Strides in Pavement Marking Performance

The Texas Transportation Institute recently completed several research projects evaluating key aspects of pavement marking effectiveness. The group looked at wider pavement marking strips, centerline rumble strips, and marking reflectivity. See the article in *Texas Transportation Researcher:* http://tti.tamu.edu/researcher/newsletter.asp?vol=40&issue=1&article=7.

Robotic Traffic Cones Hit the Road

What better way to protect highway construction workers than to keep them off the road? Robotic cones and barrels that can move out of the way, or into place, via computer commands made from a safe distance, may just make this possible. See the MSNBC News article: http://msnbc.msn.com/id/4872379/. Courtesy of Transportation Communications Newsletter.

'Smart' Traffic Signals Use the Latest Technology

From counting cars to watching over them, new traffic signals are changing the face of traffic management. Cameras mounted high over an intersection can control lights automatically by counting approaching and stopped vehicles. These cameras are cheaper to install, last longer and are more flexible than wire detectors buried in the pavement. Other traffic signals have sensors for adjusting light intensity based on the position of the sun and the presence of clouds. Read about more innovative signal technologies at WFAA.com, the Web site of a Dallas/Ft. Worth television station: http://www.wfaa.com/sharedcontent/dws/wfaa/localnews/news8/stories/wfaa040406_am_smartintersection.fdcbe7b6.html.

Crisis Management Using Traffic Signal Technology

OptiSoft Inc. and Planning Systems Inc. are forming an alliance to produce advanced traffic signal operations. PSI's acoustic detection capability (detecting gunshots, crashes and more) will combine with OptiSoft's four-way video monitoring to give dispatchers an immediate "size-up" of an incident for an appropriate personnel and equipment response. Link to Business Wire: http://home.businesswire.com/portal/site/google/index.jsp?ndmViewId=news_view&newsId=20040427006224&newsLang=en

Safe Travel/Smart Travel

Making Rural Intersections User Friendly

DOTs from Wisconsin and six other states are partnering for a Transportation Pooled Fund study that will build on recent advances in ITS technology to address a significant driver safety problem: negotiating rural intersections. See http://www.pooledfund.org/projectdetails.asp?id=306&status=4.

Travel Site Covers Three-State Corridor

The Gary-Chicago-Milwaukee travel site links to information across a three-state priority corridor, to provide travelers in the GCM corridor area with information for safe and efficient transportation decisions. Site users can link to real-time maps of road congestion and construction data, congestion and travel time reports, video images, and other helpful tools. Visit the site at http://www.gcmtravel.com/gcm/home.jsp.

Automotive RFID Gets Rolling

With government funding and access to a large swath of radio spectrum, four Radio Frequency Identification developers are starting work on a new generation of RFID products aimed at bringing greater safety and new wireless applications to U.S. roads. From *RFID Journal*: http://www.rfidjournal.com/article/articleview/866/1/1/.

Female Designers Press Safety and Comfort

A team of eight female Volvo engineers and marketers has developed a concept car that uses technology for safety and comfort and downplays gadgetry. The project is seen as part of the auto industry's growing attention to the needs of female drivers. From *Wired News*: http://www.wired.com/news/autotech/0,2554,62991,00.html?tw=wn_culthead_2.

More Ways to Get a Grip

Front-wheel, rear-wheel, four-wheel, all-wheel? For the past two decades passenger cars with front-wheel drive have dominated in the United States, but in the next few years the number of options available to auto buyers will grow. From the Louisville *Courier-Journal*: http://www.courier-journal.com/business/news2004/04/11/E1-drives11-7989.html.

Program Cuts Incident Duration in Half

This study computed incident duration when the Maryland CHART incident management program was able to provide a response and when it was not. Over two years, average incident duration was about 38 minutes with CHART and 85 minutes without it. ITS Benefits and Costs Database: http://www.benefitcost.its.dot.gov/ITS/benecost.nsf/ID/151060B2B05095D385256C6F006FF9D6.

Futuristic Vision Tests for Drivers

Scientists are looking beyond the standard acuity test in hopes of developing better tools to detect visually impaired drivers at greatest risk for a crash. From Newswise: http://www.newswise.com/articles/view/504248/.

Traffic Signals That Penalize Speeders

Newly deployed in California, "smart" traffic signals measure the speed of approaching cars and turn red if speeding drivers don't heed a warning to slow down. From the *Tri-Valley Herald*: http://www.trivalleyherald.com/Stories/0,1413,86~10669~2070611,00.html.

Incident Data Collection Standards

This research project will develop incident data collection standards for use in Virginia DOT freeway operations based on reviews of national and regional standards, interviews with VDOT professionals and extensive use of scenarios to “test” the standards. See TRB Research in Progress: http://rip.trb.org/browse/dproject.asp?n=9415.